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they would rebound from the side and start back, but would soon disappear. The globules varied in size from an eighth of an inch in diameter to very minute. Sometimes while running along they would gradually decrease in size until they would disappear, while others would disappear in an instant. In a few cases the size suddenly decreased to about one-half the original diameter, the globule then continuing on its course without further change, until it at last suddenly disappeared. Sometimes two globules would run together, combine, and continue on their course as one globule of increased size. In other cases, instead of combining they would rebound from each other like rubber balls. This rebound also took place when they ran against an air bubble. In one case a globule about one-eighth of an inch in diameter reached the side of the trough and rebounded, but it was reduced in size to about one-half of its original diameter. It was noticed, also, that they did not all move with the same velocity: some shot across the water with great rapidity, while others moved very deliberately, both kinds of movement taking place at the same time and in the same direction. In rare instances the globules stopped and lay at rest on the surface of the water until their final sudden disappearance. The rapidity was always greatest at the beginning. In order to ascertain how rapid a current there might be (the water was about a quarter of an inch deep) bits of wood were floated on the surface. The current thus indicated was many times slower than the movement of the globules.

Particular attention was given to ascertain at what place the globules originated. The falling stream made a circular depression in the water about an inch in diameter. The globules seemed to spring up from the outer edge of this depression, fall back on the surface of the water, and then run rapidly away as described above. The thought suggested itself to me that many, if not all, of the observed phenomena could be accounted for by rapid whirling motion of the globule. The gradual slackening of the motion, the fact that some stopped on the surface of the water, the quick rebound from the sides of the trough, are all effects which can easily be produced by a rapidly whirling ball on a plain surface, like the well-known movements of a billiard ball. This would also account for the phenomenon of a ball of water floating on water, without blending with it, somewhat on the same principal that stones can be made to skip over the surface of water without sinking at once; or more remotely, as the pitching of a curve in base-ball. The conditions, too, at the place of origination of the globules, were just such as would produce a sharp twisting motion. The falling stream was first turned to the side by the bottom of the trough and then upward, until at the top of the rebound the little globules sprang out.

I do not recall ever having seen the above explanation given, and so it is offered for what it is worth.

The temperature of the water was never above 30°C., which would preclude the common explanation for high temperatures. Afterwards the same effects were obtained, on a smaller scale, when the prongs of a large vibrating diapason were dipped into water to show the effects of vibration.

THE HIEROGLYPHICS AND SYMBOLS OF ANCIENT MEXICO.

BY FRANCIS PARRY, F.R.G.S., LONDON, ENGLAND.

The inquiry into the construction of the hieratic writing of the Maya people, drags its extended length over many a passing decade, and does not go forward by leaps and bounds. So it has been with the investigation of the groundwork of the symbolism of the temples, the carved slabs of Palenqué, the monoliths of Copan, the profusely ornate external walls of the numerous temples of the Yucatan peninsula. This symbolism is the very foundation of the whole matter, the essence of the spirit pervading the sacerdotal mysteries of Central America.

Mainly graven on stone, its variations are noticeable at a date far from and greatly preceding the manuscripts, consisting of the limited number of four, that have been transmitted to us. These written records, probably because of their being in a form affording an easier study than the numerous drawings represent-

ing the many sculptured remains of ancient Mexico, have had the attention of the book student fixed upon them in no ordinary degree. This concentration of thought has been a hindrance to progress, inasmuch as it surveyed a comparatively narrow field, and, observation not reaching far enough, the rise of the hieroglyphic forms, the initial composition of the hieratic writings, and the evolution of religious thought, giving life and spirit to the whole, has been but partially traced.

In order to obtain a firm grasp of the situation, the view should be extended, and broadened to the utmost bounds of our knowledge. Primitive rock scratchings, the roughest sculptured stones, the cup and ring incised carvings of prehistoric times, — each and every source of information should be called upon to contribute material.

In all study connected with hieroglyphics, in fact in all scientific research, an endeavor to find radicals, to establish simply foundation truths, and follow the processes of Nature or the compositions — the artistic productions — of the fertile brain of man from the lowest source, is the surest way of following the ramifications of evolution.

Persistent efforts to break up the mass of concrete Maya symbols have, during a century, given results that have been disappointing. Had the clue been discovered the entire outline of the sacerdotal system must have been traced. The United States Government has, however, largely contributed towards the attainment of a perfect knowledge of these ancient mysteries, by lavishly aiding inquiry and publishing from time to time records, the work of professors, accompanied by engravings which, as ideographic forms are a main feature of the system, are invaluable when the consummation of the inquiry is about to be reached.

To state that the end has been reached would be to assume the subject of Maya symbolism is exhausted. I may, however, confidently predict we are on the high road to the desired goal and announce the striking of a vein, the discovery of the lode, and invite scientists to scrutinize my observations upon that Maya relic, "The Sacred Stone." The whole question of its identity, is treated in a popular manner in a monograph entitled, "The Sacred Maya Stone of Mexico and its symbolism." The stone had been misnamed, and its use conjectured. Supposed to be connected with the ancient Aztec ritual or sacrifices, it was given an incorrect place chronologically, historically.

In the museums of the United States and throughout the archaeological collections of Europe, it has been classed as sacrificial. That excellent serial, "Archives International d'Ethnographie," published in Leiden, has in Volume III. an exhaustive disquisition on the many varieties of the stone by Herr Strebel of Hamburg. The conclusion he arrived at is the rejection of the nomenclature of the museums. In this result I heartily concur, but taking an independent view and a new departure, I venture to assert and am prepared to prove it to be a relic of paramount interest. Its earliest archaic type is the key to opening out a vista of a nature worship of wide extent, and the ornate, highly finished examples demonstrate evolution, in religious thought, a recognition of combined natural forces, and *solve the mysteries*.

CURRENT NOTES ON ANTHROPOLOGY.—XXVI.

[Edited by D. G. Brinton, M.D., LL.D.]

The Ethnic Study of Religions.

A SUGGESTIVE sketch on "Recent movements in the historical study of religions in America" appears in a late number of *The Biblical World* from the pen of Professor Morris Jastrow, Jr. He details the progress of the historical and comparative study of religions, both in this country and in Europe, and very properly urges its importance as a branch of instruction in universities and similar institutions.

It appears, however, that it is now generally taught as a branch of psychology, ethics, speculative philosophy or doctrinal instruction. This is unfortunate, as these are not the real and nearest relations to religions. Their closest ties are to ethnic characteristics, and only by the light of these can they be clearly

comprehended. This is nowhere better illustrated than in the religions of the two great branches of the White Race, the Semites and Aryans. As Dr. Heinrich Schurtz points out in his "Katechismus der Volkerkunde," Christianity, which is ethnologically a polytheism, has been and remains as distasteful to the Semite, as are his localized monotheisms to the Aryan. "The greatest triumph," remarks Mr. G. L. Gomme, in his excellent little book, "Ethnology in Folk-lore," "of the Aryan race was its emancipation from the principle of local worship." It is tied neither to Mecca nor Jerusalem.

These characteristics of religions which obtain historic permanence, find their roots in marked ethnic features, as the tendency to abstraction among the eastern Aryans; and the sphere of their influence is limited by these. Proselytes of another race do not accept the religion as it is taught them, because they cannot. They are proselytes in name only. As Karl von den Steinen remarks of the Christianized natives of Brazil, "They understand its real doctrines about as much as they do the theory of spectral analysis." Only when the historical and comparative study of religions is prosecuted definitely as a branch of ethnology can it attain the best results.

The Stature of the Most Ancient Races.

Has the species of man increased or diminished in stature since it first appeared on this planet? Have his bones increased or diminished in solidity and weight? Have the relations in these respects between the two sexes always been as they are now?

These are some of the very interesting questions approached by Dr. J. Rahon in a recent paper in the *Memoirs of the Anthropological Society of Paris*, entitled, "Recherches sur les Ossements Humains Anciens et Préhistoriques." It occupies about sixty pages, and is the fruit of most laborious and creditable investigation, both in the collection and digestion of facts.

His conclusions may be briefly stated. Comparing the earliest quaternary skeletons found in western Europe with those of the present population, the former belonged to what we should call medium-sized people, with an average stature, of the males, of 1.63 metres. The tribes of neolithic times varied scarcely at all from this measurement; but the proto-historic nations, the Gauls, Franks, Burgundians, etc., ran the figures up to a mean of 1.66 for the males; since their epoch it has been steadily, though slowly, descending, at least in France, until the average of the Parisian men of to-day is 1.62 metres.

In all ages, the women have averaged about ten centimetres less in height than the men. The bones of both were rather heavier and more powerful in ancient times.

Incidentally, Dr. Rahon shows that the height of the men of Cro Magnon has been over-estimated; that of the man of Spy under estimated; that the Guanches of Teneriffe averaged but one centimetre above the French of to-day, and osteologically were very similar to the Cro Magnon people; that from the most remote time the human body has retained the same proportions; and other suggestive inferences.

The Character of the Glacial Epochs.

The "glacial period" has its greatest interest because it seems to have occurred about the time that man first appeared on earth. Two careful studies of it have recently appeared in *Das Globus*, one by Dr. von Ihering, in an article on the "Palæo-Geography," of South America; the other by Dr. Nehring, in reference to Europe.

In spite of some recent claims to the contrary (see *Science*, March 11, 1892, p. 146) Dr. von Ihering is positive that the birthplace of the human race need not be looked for in South America. Its chief land-mass was once connected with Australia and Africa; but this connection was broken in middle tertiary times. Sometime in the pliocene it first became connected by a land-bridge over Florida and Cuba with North America, and an extensive interchange of mammals took place. The Pampas are pliocene, and show no signs of glacial action. This appears in the pleistocene, and the great glaciers of South America were contemporaneous with those of North America.

Dr. Nehring has occupied himself with tracing the distribution of the steppe fauna into Central and Western Europe in quaternary times. His conclusion is that it extended widely in this direction at a certain period, which he believes marks an interglacial epoch, covering thousands of years, and characterized by a comparatively dry and mild climate, and a notable diminution in glacial activity. The displacement of the steppe fauna, which then flourished in Germany and France, by an Arctic fauna, points to the re-establishment of glacial conditions.

Geologists as well as naturalists are fully alive to the multiple bearings of glacial events on diverse branches of science. The new *Journal of Geology*, started this year by the University of Chicago, has its initial number principally made up of contributions on glacialism. One of them, by Mr. W. H. Holmes, on "Glacial Man in the Trenton Gravels," is distinctly archaeological. He sets forth the difficulties in the way of accepting the evidence advanced, and, while rejecting it as inadequate, does so in a fair and unprejudiced tone.

Ethnography of Central America.

Among those whose published studies have considerably aided in the advancement of knowledge concerning the geography, archæology and ethnography of Central America, M. Désiré Pector, consul of Nicaragua at Paris, deserves an honorable position. He has been for years an active officer in the *Société Américaine de France*, and in the *Congrès International des Américanistes*. Among the various articles which he has recently issued, one touches on the origin of the name America. This has been derived by Marcou and others from the native word "Amerrique," applied to a chain of mountains on the Atlantic coast of Nicaragua. M. Pector, however, shows that the correct form is "Amerrisque," and rejects the Marcou hypothesis.

In a more extended study, M. Pector takes up a large number of the native geographical names of Central America, and attempts to trace their etymology. It is in part an appendix to an earlier essay on the localisation of the principal tribes of that region at the time of the conquest. Unfortunately, many of the Central American languages are so little known that their methods of compounding words are obscure, and such studies can at present be little more than gropings.

The archæology of Salvador affords him another theme, which he treated in the *Archiv. Internat. d'Ethnographie* last year, apropos of Montessus de Ballore's book on the subject.

The field which M. Pector has chosen for his studies is one rich in itself, and abounding in significance for the ancient ethnography of both American continents. In that narrow isthmus were centred and compressed the migratory streams from the north and south; and the problems of those migrations must look there for their solutions.

The Republic of Costa Rica lies at its southern extremity; and, concerning its ethnography, two recent works deserve prominent mention. The one of these is by Señor Manuel M. de Peralta, a pamphlet bearing the title, "Apuntes para un Libro sobre los Aborígenes de Costa Rica," Madrid, 1893. With a great deal of care and a singularly thorough knowledge of sources, the author has collected a surprising amount of material regarding the names, localities and affinities of the tribes who inhabited the region at the time it first became known to European observers.

Complementary to this, giving, on the other hand, the condition of the native tribes as they are to-day, is the *Viaje de Exploracion al Valle del Rio Grande de Terraba*, of Mr. H. Pittier, Director of the Physico-Geographical Institute of Costa Rica, (printed at San José de Costa Rica). The author is primarily a botanist and geologist, but his observations on the Terrabas, Bruncas and allied tribes are fresh, and full of information.

A MEETING of the Essex Institute, Salem, Mass., in memory of its late president, Henry Wheatland, will be held at Academy Hall, Salem, Monday, April 17, 1893, at eight o'clock P.M. Vice-President Goodell will preside, and addresses are expected from Honorable R. S. Rantoul, Professor E. S. Morse, Rev. E. C. Bolles, D.D., and others.